MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

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Standard Reference Materials Program
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RM Number: 8504
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RM Name: Transformer Oil

Date of Issue: 14 February 2006

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

Description: This Reference Material (RM) is intended for use as a diluent oil with Standard Reference Materials (SRMs) 3075–3080 and SRM 3090, for the purpose of developing and validating methods for the determination of polychlorinated biphenyls (PCBs) as Aroclors in transformer oil or similar matrices. SRMs 3075–3080 and SRM 3090 contain individual Aroclors in the same transformer oil used to prepare RM 8504. Each unit of RM 8504 consists of one amber glass bottle containing approximately 100 mL.

Substance: Transformer Oil

Other Designations: Hydrotreated light naphthenic distillates (petroleum); distillates, petroleum, hydrotreated light naphthenic; hydraulic petroleum oil; mineral oil, petroleum distillates, hydrotreated light naphthenic; technical white oil; petroleum electrical insulating oil.

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component:	Transformer Oil
CAS Number:	64742-53-6
EC Number (EINECS):	265-156-6
Nominal Mass Fraction (%):	99.9
EC Classification:	T (Toxic), Carc. Cat. 2
EC Risk:	R36/37/38 (irritating to eyes, respiratory system and skin) R45 (may cause cancer)
EC Safety:	S45 (in case of accident or illness, see doctor; show label) S53 (avoid exposure – obtain special instructions before use)

Note: No additional constituents have been added to this oil. PCBs (as Aroclors) comprise less than 0.1 mg/kg oil and do not require MSDS documentation.

3. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0-4): Health = 2 Fire = 1 Reactivity = 0

Major Health Hazards: The principal hazard is irritation to the skin, eyes, mucous membranes, and upper respiratory tract. Inhalation of oil mist may cause lung damage. Despite the EC classification, this material alone is not a known human carcinogen, although related materials have caused tumors in laboratory animals.

Physical Hazards: Heated containers or incompatible mixtures may explode (Section 10); mechanical stress may shatter glass container; oil spills may be slippery.

Potential Health Effects

Inhalation: The vapor pressure of this material is very low, but inhalation of droplets, mists or fumes may irritate the mucous membranes and cause severe lung injury. Studies have shown that many petroleum hydrocarbons and synthetic lubricants pose health risks that vary from person to person.

Skin Contact: Prolonged or repeated contact with this material may cause skin irritation, drying, redness, and dermatitis. Repeated application of mildly hydrotreated oil has induced skin tumors in mice.

Eye Contact: Contact with this material may cause moderate to severe eye irritation.

Ingestion: Ingestion of this material may cause abdominal pain, nausea, and vomiting. Oral toxicity is low, but small amounts of oil aspirated during ingestion or vomiting may cause lung damage (see Inhalation).

Medical Conditions Aggravated by Exposure: Emphysema, asthma, dermatitis, conjunctivitis, or other chronic conditions affecting the target organs.

Listed as a Carcinogen/ Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs	X	
By the Occupational Safety and Health Administration (OSHA)		X

Note: The EC classification as a carcinogen may refer to PCBs, PAHs, or other contaminants often present in transformer oil.

4. First Aid Measures

Inhalation: Move the person to fresh air immediately. Qualified medical personnel may start CPR or give oxygen if necessary. Get medical aid at once, and bring the container or label.

Skin Contact: Remove contaminated clothing and shoes. Flush affected skin with water for at least 1 minute, then wash thoroughly with soap and water. If skin irritation persists, get medical aid and bring the container or label. Wash contaminated clothing before reusing.

Eye Contact: Remove contact lenses (if any). Do not allow victim to rub eyes or keep eyes closed. Flush eyes with large amounts of running water for at least 30 minutes, keeping eyelids open and raising lids to remove all chemical. Get medical aid at once, and bring the container or label.

Ingestion: Contact a poison control center immediately for instructions. Wash out mouth with water, but do not induce vomiting. If vomiting occurs, keep head down to reduce risk of aspiration. Get medical aid at once, and bring the container or label.

5. Fire Fighting Measures

Fire and Explosion Hazards: Transformer oil is combustible and represents a slight fire hazard. Heating this material greatly increases the fire hazard.

Extinguishing Media: Use a smothering technique with dry chemical powder, carbon dioxide, or foam to extinguish an oil fire. Use a water spray to cool containers only. Do not use a forced water stream directly on an oil fire, as this will only scatter the fire.

Fire Fighting: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Flash Point (°C): 146 (295˚F)

Autoignition (°C): > 204 (399˚F)

Lower Explosive Limit (LEL): 0.9%

Upper Explosive Limit (UEL): 7%

Flammability Class (OSHA): Class IIIB

Products of Combustion: Thermal oxidative degradation of this material may yield oxides of carbon (CO, CO_2) and other hazardous gases.

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: Immediately notify safety personnel of leaks and spills. Remove sources of heat or ignition and provide adequate ventilation. Stop spill at source, if possible. Cleanup personnel must wear suitable protective equipment to avoid contact or inhalation. Use absorbent material to contain small spills, such as fire retardant treated sawdust, rags, polyurethane foam, activated carbon, or sand. Collect in an appropriate container for disposal. Large oil spills (sheen on navigable water surface) must be reported to the National Response Center: 1-800-424-8802. Clean up all spills promptly to reduce fire or toxicity hazards.

Disposal: Refer to Section 13, Disposal Considerations.

7. HANDLING AND STORAGE

Storage: Store this material in sealed original containers at room temperature (below 30˚C). Protect from light, heat, ignition sources, physical damage, and contact with incompatible materials.

Safe Handling Precautions: Wear gloves and chemical safety goggles (Section 8). Engineering controls should maintain airborne concentrations below TLV (Section 8).

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

ACGIH TLV-TWA: 5 mg/m^3 (mineral oil mist)
OSHA TLV-TWA: 5 mg/m^3 (mineral oil mist)

Ventilation: Use local or general exhaust to keep employee exposures below limits. Local exhaust ventilation is preferred because it can control contaminant emissions at the source, preventing dispersion into the general work area. Refer to the ACGIH document *Industrial Ventilation, a Manual of Recommended Practices*.

Respirator: If necessary, refer to the NIOSH document *Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84* for selection and use of respirators certified by NIOSH.

Eye Protection: Use chemical safety goggles where splashing may occur. See OSHA standard (29 CFR 1910.133) or European Standard EN166. The employer should provide an emergency eye wash fountain and safety shower in the immediate work area.

Personal Protection: Wear appropriate gloves and protective clothing to prevent contact with skin. Remove oil-soaked clothing and launder before wearing again. Wash exposed skin areas.

9. PHYSICAL AND CHEMICAL PROPERTIES

Component: Transformer Oil

Appearance and Odor: Clear liquid, mild petroleum odor

Relative Molecular Weight: Approximately 255

Molecular Formula: Complex hydrocarbon mixture

Density (g/cm^3): 0.88

Solvent Solubility: N/A

Water Solubility: Insoluble

Boiling Point (°C): 238 (460˚F)

Melting/Freezing Point (°C): -48 (-55˚F)

Vapor Pressure (Pa): Negligible

Vapor Density (Air = 1): > 2.0

Critical Solution Temperature: N/A

pH: Neutral

10. STABILITY AND REACTIVITY

Stability: __X__ Stable _____Unstable

Stable at normal temperatures and pressure.

Conditions to Avoid: Contact with heat, ignition sources, or incompatible materials. Do not store in open or unlabelled containers.

Incompatible Materials: Strong oxidizing agents (fire and explosion hazard); concentrated chlorine, concentrated oxygen, sodium hypochlorite, or calcium hypochlorite.

Fire/Explosion Information: See Section 5.

Hazardous Decomposition: Thermal oxidative degradation of this material may yield oxides of carbon (CO, CO_2) and other hazardous gases.

Hazardous Polymerization: _____ Will Occur __X__ Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: __X__ Inhalation __X__ Skin __X__ Ingestion

Toxicity Data:

Rat, oral: LD_{50} > 5 g/kg body weight
Rabbit, acute dermal: LD_{50} > 5 g/kg body weight

Target Organ(s): Skin and upper respiratory tract.

Mutagen/Teratogen: In vitro and in vivo genetic toxicity studies of this material have yielded inconsistent results. In some cases, a significant increase in aberrant cells was reported. The toxicity of this material has not yet been fully evaluated.

Health Effects: See Section 3.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data:

Trout (*Oncorhynchus mykiss*): LC_{50} (96 hrs) > 1000 mg/L
Fathead minnow (*Pimephales promelas*): LC_{50} (96 hrs) > 30,000 mg/L
Water flea (*Daphnia magna*): EC_{50} (48 hrs) > 1000 mg/L

Environmental Fate: The half-life for degradation of this material in air is expected to be less than one day. When released to water, hydrocarbons are not susceptible to hydrolysis; most of this material is adsorbed onto particulate matter in water, soil, or sediment. Biodegradation occurs slowly under aerobic conditions.

Environmental Summary: The acute ecotoxicity of this material is low, and the environmental impact of a small spill is limited; however, effects are cumulative and spills must be contained. See Disposal Considerations.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Options for used oil management include processing for re-use or disposal as RCRA hazardous waste. Contamination of this product may change the waste management options. Waste oil must be tested for ignitability to determine the applicable EPA hazardous waste numbers. Dispose of container and unused contents in accordance with federal, state, and local requirements, which vary according to location. Decontaminate containers before recycling. Do not flush to sewer or allow this material to enter a watercourse.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Not regulated

15. REGULATORY INFORMATION

U.S. REGULATIONS

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated

SARA Title III Section 302: Not regulated

SARA Title III Section 304: Not regulated

SARA Title III Section 313: Not regulated

OSHA Process Safety (29 CFR 1910.119): Not regulated

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE:	Yes
CHRONIC:	Yes
FIRE:	No
REACTIVE:	No
SUDDEN RELEASE:	No

STATE REGULATIONS

California Proposition 65: Not regulated

CANADIAN REGULATIONS

WHMIS Classification: Not determined.

EUROPEAN REGULATIONS

EU/EC Classification: T (Toxic), Carc. Cat. 2

NATIONAL INVENTORY STATUS

U.S. Inventory (TSCA): Listed

TSCA 12(b), Export Notification: Not listed

16. OTHER INFORMATION

Sources:

IUCLID Chemical Data Sheet: Distillates (Petroleum), Hydrotreated Light Naphthenic. European Chemicals Bureau, 18 February 2000.

McKee RH, et al, Dermal carcinogenic potential of unrefined and hydrotreated lubricating oils. *Journal of Applied Toxicology* 1989; 9(4):265-270.

U.S. National Institute for Occupational Safety and Health, *NIOSH Pocket Guide to Chemical Hazards*, June 1990 edition. DHHS (NIOSH) Publication No. 90-117.

U.S. National Institute of Standards and Technology, Report of Investigation: Standard Reference Material® 8504, Transformer Oil. 01 February 2006.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.